



COAL MINE METHANE UNITS CONVERTER



English to Metric (SI) Conversion Factors		
Unit	mult. →	Unit
	← div.	
Cubic foot (ft^3)	0.02832	Cubic meter (m^3)
Pound (lb)	0.4536	Kilogram (kg)
Short ton (ton)	0.9072	Metric ton (tonne), (t)
British thermal unit (Btu)	1055	Joule (J)

Coal Mine Methane Conversion Factors		
Unit	mult. →	Calc. # (see reverse)
	← div.	Unit
Cubic foot (ft^3) CH_4	0.04246	Pound (lb) CH_4
Cubic foot (ft^3) CH_4	1,014.6*	Btu
Cubic foot (ft^3) CH_4	0.2974	Kilowatt-hour _(t) ($\text{kWh}_{(t)}$)
Cubic foot (ft^3) CH_4	0.000404	Tonne CO ₂ equivalent
Cubic foot (ft^3) CH_4	0.00011	Tonne C equivalent
Cubic foot (ft^3) CH_4	19.26	Gram (g)
Pound (lb) CH_4	23,896	Btu
Pound (lb) CH_4	7	Kilowatt-hour _(t) ($\text{kWh}_{(t)}$)
Pound (lb) CH_4	0.00953	Tonne CO ₂ equivalent
Pound (lb) CH_4	0.0026	Tonne C equivalent
Btu	0.000293	Kilowatt-hour _(t) ($\text{kWh}_{(t)}$)
CH_4 GWP**	21	CO ₂ GWP
CO ₂	0.27273	C equivalent
CH ₄	5.7273	C equivalent

*Higher heating value (HHV) @60° F, 30" Hg, dry.

**GWP = Global warming potential over a 100-year time frame (GWP for carbon dioxide = 1). The value is 18.25 when CH_4 does not displace fossil fuel (e.g., when flared).

Equivalents		
Unit	mult. →	Calc. # (see reverse)
	← div.	Unit
Households heated/year	70	Million Btu natural gas
Billion cubic feet (bcf) CH_4	14,494	Households heated/year
Billion cubic feet (bcf) CH_4	121,390	Acres of trees planted
Billion cubic feet (bcf) CH_4	89,016	Cars/year that emit equiv. CO ₂

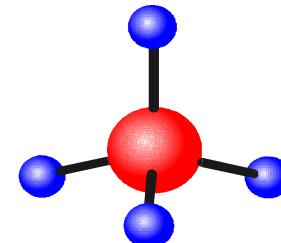
Convert your safety problem into a profitable asset.
Coal mine methane is a valuable energy resource!

Calculations
[calc. 1] $1 \text{ ft}^3 \text{ CH}_4 = 1,014.6 \text{ Btu}/\text{ft}^3 \times 1/3,412 \text{ kWh}_{(t)}/\text{Btu} = 0.2974 \text{ kWh}_{(t)}^{\wedge}$
[calc. 2] $1 \text{ ft}^3 \text{ CH}_4 = 0.04246 \text{ lb}/\text{ft}^3 \times 1/2,204.6 \text{ lb/tonne} \times 21 = 0.000404 \text{ tonne CO}_2 \text{ eq.}^{\wedge\wedge}$
[calc. 3] $1 \text{ ft}^3 \text{ CH}_4 = 0.000404 \text{ tonne CO}_2 \text{ eq.} \times 12/44 \text{ C:CO}_2 \text{ ratio} = 0.00011 \text{ tonne C eq.}^{\wedge\wedge}$
[calc. 4] $1 \text{ ft}^3 \text{ CH}_4 = 0.04246 \text{ lb}/\text{ft}^3 \times 0.4536 \text{ kg/lb} = 19.26 \text{ grams}$
[calc. 5] $1 \text{ lb CH}_4 = 23,896 \text{ Btu} \times (1/3412) \text{ kWh}_{(t)}/\text{Btu} = 7.0 \text{ kWh}_{(t)}$
[calc. 6] $1 \text{ lb CH}_4 = (1/2,204.6) \text{ tonne/lb} \times 21 = 0.00953 \text{ tonne CO}_2 \text{ eq.}^{\wedge\wedge}$
[calc. 7] $1 \text{ lb CH}_4 = 0.00953 \text{ tonne CO}_2 \text{ eq.} \times 12/44 \text{ C:CO}_2 \text{ ratio} = 0.0026 \text{ tonne C eq.}^{\wedge\wedge}$
[calc. 8] $\text{CO}_2 = 12/44 (\text{C:CO}_2 \text{ ratio}) = \text{C eq.}$
[calc. 9] $\text{CH}_4 = 21 \text{ GWP} \times 12/44 (\text{C:CO}_2 \text{ ratio}) = \text{C eq.}^{\wedge\wedge}$
[calc. 10] $1 \text{ bcf CH}_4 = (1,014.6 \times 10^9) \text{ Btu} \times (1/(70 \times 10^6)) = 14,494 \text{ households/year}$

[^]kWh_(t) = kilowatt-hours thermal; does not account for efficiency (heat rate).

[^]When flaring coal mine methane, the net offset is this value multiplied by a factor of (18.25/21).

Nomenclature	
m	= thousand (kilo; k (SI unit); 10^3)
mm	= million (mega; M (SI unit); 10^6)
b	= billion (giga; G (SI unit); 10^9)
mcf	= thousand cubic feet
mmcf	= million cubic feet
bcf	= billion cubic feet



For technical and economic information on coal mine methane project development opportunities, visit the U.S. Environmental Protection Agency's Coalbed Methane Outreach Program web site at www.epa.gov/coalbed.